

2



**US Army Corps
of Engineers**

Construction Engineering
Research Laboratory

USA-CERL TECHNICAL REPORT N-88/09
June 1988

AD-A196 723

A Computer Program To Help Evaluate MCA Project Priorities

by
Mark Cole
John J. Fittipaldi
I. Wes Wheeler

A commercial software program (Lightyear) was customized to help U.S. Army Forces Command (FORSCOM) planners prioritize Military Construction, Army (MCA) projects. This program is intended for users with little or no previous computer experience. After listing all the facilities and structures (alternatives) being prioritized, the user assigns to each project numerical ratings for the factors and criteria being considered (examples are given in this manual). The program then adds the ratings and shows on bar graphs how the alternatives compare with each other. Instructions for installing and using the applied program are included.

DTIC
ELECTE
JUL 06 1988
S H D

Approved for public release; distribution is unlimited.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE				Form Approved OMB No 0704 0188 Exp Date Jun 30 1986	
1a REPORT SECURITY CLASSIFICATION Unclassified			1b RESTRICTIVE MARKINGS		
2a SECURITY CLASSIFICATION AUTHORITY			3 DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.		
2b DECLASSIFICATION/DOWNGRADING SCHEDULE					
4 PERFORMING ORGANIZATION REPORT NUMBER(S) USA-CERL TR N-88/09			5 MONITORING ORGANIZATION REPORT NUMBER(S)		
6a NAME OF PERFORMING ORGANIZATION U.S. Army Construc Engr Research Laboratory		6b OFFICE SYMBOL (If applicable)	7a NAME OF MONITORING ORGANIZATION		
6c ADDRESS (City, State, and ZIP Code) P.O. Box 4005 Champaign, IL 61820-1305			7b ADDRESS (City, State, and ZIP Code)		
8a NAME OF FUNDING/SPONSORING ORGANIZATION HQFORSCOM		8b OFFICE SYMBOL (If applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER Intra-Army Order (IAO) 30-86, dated March 12, 1986, titled "Project Priority System"		
8c ADDRESS (City, State, and ZIP Code) Fort McPherson, Georgia 30330-5000			10 SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO	PROJECT NO	TASK NO
					WORK UNIT ACCESSION NO
11 TITLE (Include Security Classification) A Computer Program To Help Evaluate MCA Project Priorities					
12 PERSONAL AUTHOR(S) Mark Cole, John J. Fittipaldi, I. Wes Wheeler					
13a TYPE OF REPORT final		13b TIME COVERED FROM TO		14 DATE OF REPORT (Year, Month, Day) 1988, June	
				15 PAGE COUNT 30	
16 SUPPLEMENTARY NOTATION Copies are available from the National Technical Information Service Springfield, VA 22161					
17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP			
15	05		Maintenance Management		
			Computer Programs		
			Lightyear (computer program)		
19 ABSTRACT (Continue on reverse if necessary and identify by block number)					
<p>A commercial software program (Lightyear) was customized to help U.S. Army Forces Command (FORSCOM) planners prioritize Military Construction, Army (MCA) projects. This program is intended for users with little or no previous computer experience. After listing all the facilities and structures (alternatives) being prioritized, the user assigns to each project numerical ratings for the factors and criteria being considered (examples are given in this manual). The program then adds the ratings and shows on bar graphs how the alternatives compare with each other. Instructions for installing and using the applied program are included.</p>					
20 DISTRIBUTION AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21 ABSTRACT SECURITY CLASSIFICATION		
22a NAME OF RESPONSIBLE INDIVIDUAL Gloria Wienke			22b TELEPHONE (Include Area Code) (217) 352-6511 ext. 358		22c OFFICE SYMBOL CEGER-IMT

DD FORM 1473, 84 MAR

84 APR edition may be used until exhausted
All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE

UNCLASSIFIED

FOREWORD

This project was performed for the Master Planning Branch, Headquarters, U.S. Army Forces Command (HQFORSCOM), under Intra-Army Order (IAO) 30-86, dated March 12, 1986, titled "Project Priority System." Mr. James Carmody (AFEN-RMP) was the Technical Monitor.

This research was accomplished through the collaborative efforts of the U.S. Army Construction Engineering Research Laboratory (USA-CERL) and the University of Illinois, Urbana/Champaign, Department of Urban and Regional Planning. Wes Wheeler and Mark Cole, Department Research Associates, were the principal authors and John Fittipaldi was USA-CERL's Principal Investigator and is the point of contact. Dr. R. K. Jain is Chief of USA-CERL's Environmental Division (EN). The Technical Editor was Gloria J. Wienke, Information Management Office.

COL Norman C. Hintz is Commander and Director of USA-CERL and Dr. L. R. Shaffer is Technical Director.



Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Avail and/or	
Dist	Spec
A-1	

CONTENTS

	Page
DD FORM 1473	1
FOREWORD	3
LIST OF FIGURES	5
1 INTRODUCTION	7
Background	
Objective	
Approach	
2 SYSTEM EVALUATION	8
Current System	
Criteria for Proposed System	
3 INSTALLING LIGHTYEAR ON YOUR COMPUTER	11
Operating System and Hardware Requirements	
Program Installation	
4 STARTING THE PROGRAM AND USING THE MENUS.....	13
Main Menu	
Utilities Menu	
Backup Your Work	
Models Menu	
Alternatives Menu	
Criteria Menu	
Rules Menu	
Evaluate Menu	
5 SUMMARY	17
APPENDIX A: Example User Session	18
APPENDIX B: FORSCOM Criteria Value Ranges	23
DISTRIBUTION	

FIGURES

Number		Page
A1	Main Menu	19
A2	Models Menu	19
A3	Alternatives Menu	20
A4	Criteria Menu	20
A5	Facility Use Screen	21
A6	Evaluation Choices	21
A7	Alternatives Total Scores	22
A8	Detailed Evaluation of One Alternative	22
B1	Facility Use Values	23
B2	Readiness Values	23
B3	Environment Values	24
B4	Quality of Life Values	24
B5	Health Values	25
B6	Security Values	25
B7	Risk Assessment Values	26
B8	Mission Factor Values	26
B9	Condition Values	27

A COMPUTER PROGRAM TO HELP EVALUATE MCA PROJECT PRIORITIES

1 INTRODUCTION

Background

U.S. Army Forces Command (FORSCOM) planners are faced with important and complex decisions when prioritizing construction projects for funding requirements. Allocation of funds for Military Construction, Army (MCA) projects depends on the project's importance to the Army, and more specifically, to FORSCOM. Planners need an objective, replicable, factor-based process to foster accurate and comprehensive identification, validation, and budgeting of all future MCA construction requirements.

The manual FORSCOM process to prioritize MCA projects is directed towards accomplishing these goals for all construction requirements (which are based on the installation's master plan). However, FORSCOM tasked the U.S. Army Construction Engineering Research Laboratory (USA-CERL) to develop an automated system that allows greater creativity in prioritization and provides a permanent record of the alternatives considered, criteria applied, and any assumptions made.

Objective

The objective of this project was to develop a customized computer program to help FORSCOM installation decisionmakers prioritize MCA projects and to provide instructions on the use and application of that customized computer program.

Approach

The first step in this project was to evaluate FORSCOM's current prioritization process and determine the inherent assets and liabilities. The next step was to examine current decision modeling software programs for potential application to FORSCOM's requirements. The final step was to customize the most appropriate program and prepare instructions on its use and application.

2 SYSTEM EVALUATION

Current System

Army construction may be programmed through a number of regulations, and may be authorized and appropriated for by separate Congressional acts. Military installation construction may also be accomplished using nonappropriated or private funding. MCA programs are authorized through Army Regulation (AR) 415-15 *Military Construction, Army (MCA) Program Development*¹. MCA appropriations provide funds to meet specific Army requirements for major (greater than \$200K, with no given upper limit) and minor (greater than \$200K, but less than \$1000K) construction. Such requirements are listed in the Five Year Defense Program (FYDP) as part of the Department of Defense (DOD) Programming System. As defined in AR 415-15, MCA projects are those based on the installation's master plan. An installation may submit an MCA project request if its long-range strength is included in the Army Stationing and Installation Plan (ASIP) or it is a temporary overseas installation. The process of determining which projects should be included in the MCA program is as follows:

1. Develop master plan components that will show the facilities needed for the installation's long-range development (using criteria such as assigned strength, workloads, and the installation mission statement).
2. Compare the total requirements generated in step 1 with existing installation assets.
3. Estimate the difference (net requirements) which must be obtained and which cannot be met through continuing operations and maintenance (OMA) funding. This sum should yield total new construction requirements. Those projects which cannot be met through other means (e.g., nonappropriated or private funding) will most likely be included in the MCA program.
4. Submit all annual project requests, based on the steps above, to the appropriate Major Command (MACOM) and Headquarters, Department of the Army (HQDA). The sum of all installation requests which are approved become the Army's future construction program.

The cornerstone to preparing successful MCA project requests can be found in the following citation from AR 415-15 paragraph 1-4. d.:

"Preference is given to the projects having the highest priority."

To assist FORSCOM Directorate of Engineering and Housing (DEH) personnel in preparing their MCA requests, USA-CERL researchers were tasked to develop an automated, systematic, and replicable process that would expedite a quick, thorough, objective review of an installation's proposed MCA construction projects. This automated review process would provide a framework for installation decisionmakers to articulate criteria and weigh priorities for each project. FORSCOM reviewers and decision makers would then have a universal standard against which to gauge a wide variety of projects from a diverse set of installations.

¹Army Regulation (AR) 415-15 *Military Construction, Army (MCA) Program Development*, (Headquarters, Department of the Army [HQDA], 1 January 1984).

Criteria for Proposed System

A number of commercial computer programs were considered for this project. Lightyear* was eventually chosen because it most closely met FORSCOM's requirements.

The important considerations were as follows:

- compatibility with nonappropriated funds (NAF) and BMAR decision matrices
- minimal computer hardware requirements
- user-friendly setup and use
- ability to quickly change choices to produce a "what if" set of alternatives
- ability to easily update with new versions
- complete documentation for user reference
- expansion capability to give the user a choice of performing more difficult functions (such as the rules input discussed later).

The compatibility with existing matrices used in the MCA prioritization process was most important. For the program to be effective, it would have to allow the input and analysis of information in a manner similar to other existing automated or manual processes. The existing processes use matrix comparison techniques where alternatives (facilities and structures) on one side of the matrix are ranked (scored) for each of a number of alternatives on the other side of that matrix. The alternatives are assigned a point value from a given range for each criterion. The ultimate goal of this matrix arrangement is to determine a total score (also known as a weighted score) based on the weight that the evaluator gives to each criterion. The Lightyear computer program is ideally suited for this process. The program's final evaluation screen produces the matrix in easy-to-understand bar graphs. The program also allows the user to break down each alternative and the bar graph example for each criterion. The input menus in this program provide an easy means of adding or deleting alternatives and/or weighted scores for each criterion to generate alternative "what if?" matrices.

The second and third considerations were the amount of computer hardware and level of computer expertise which the average user possesses. It was assumed that both hardware and experience would be minimal. Thus, a system which needed few accessories and little technical know-how was required. Lightyear needs only the processing unit, a monitor (monochrome or color), and at least one disk drive (the basic configuration of any personal computer). It runs on the almost universal MS-DOS operating system for IBM and compatible computers. A menu system where the user moves the cursor and uses function keys to "point and select" makes it user friendly.

The fourth consideration was the ability to allow the user to choose between a range of alternative decision matrices. This is the essence of the prioritization process. If the user gives different weights for the established criteria or lists different alternatives to consider, what would be the "end scores" and how would they compare?

*Lightyear is a registered trademark of Lightyear, Inc.

The strongest benefit of Lightyear is that it allows the user to save the original choice and quickly generate alternative matrices by going through the menus again. Comparison of the alternative matrices is made easy by presenting the data in bar graphs.

The final considerations were ease of incorporating updates, user reference material, and the capability to allow more complex functions by advanced users. Update(s), if any, will be provided by USA-CERL. The Lightyear manual* is well documented and easy to read. The Rules Menu allows the more advanced user to incorporate outside variables that affect the prioritization process.

**Lightyear, The Decision Modeling Software* (Lightyear, Inc., 1984). Note: This report contains instructions on how to use the applied program and should be viewed as an auxiliary user's manual to complement the Lightyear manual.

3 INSTALLING LIGHTYEAR ON YOUR COMPUTER

Operating System and Hardware Requirements

Lightyear requires a personal computer (PC) running MS-DOS or PC-DOS, Version 2.0 or higher. The version number can be found on the disk which came with the operating system package or by typing "version" in the computer's DOS directory.

The PC can have either one or two floppy disk drives (the slot into which you place the computer disks). Some computers also have an internal hard disk drive. The computer must have at least 196K of random-access memory (RAM) which is the computer's internal work space. The computer's RAM amount is displayed when you boot it up (see your DOS manual for instructions on booting up). This basic machine is called the central processing unit (cpu).

Lightyear may be used with either a monochrome or a color monitor and the output can be printed on any parallel printer capable of IBM or Epson graphics.

Program Installation

The Lightyear software package consists of a Lightyear users manual and two disks. One disk contains the Lightyear programs and the second contains examples that can be used to learn about Lightyear.* In addition to the Lightyear software package, the user must have a third disk which contains the applied Lightyear model based on established Army standards.**

Lightyear and its models may be operated from either one or two floppy disk drives or one floppy disk drive and a hard disk drive.

One or Two Floppy Disk Drives

When Lightyear is started up on a computer system, it looks for a location in one of the disk drives to either retrieve existing models (files previously created by the user) or a place to store new models (on a blank or partially filled disk).

If your computer system has a single disk drive, Lightyear will prompt you with the following message: Replace the disk in drive A with the DATA disk, press F2. If your computer system has two disk drives, the Lightyear program disk should be inserted into drive A (usually the top or left drive) and the data disk should be placed in drive B. If you have not created any models, place a blank disk in drive B and format it using the DOS Format command. You should always check that the disk to be formatted is actually blank (by typing dir A: or dir B:, depending on which drive the disk is in) and always designate which drive contains the blank disk. See your DOS manual for complete Format instructions.

*This package must be obtained from its commercial vendor.

**This application disk must be obtained from USA-CERL-EN personnel.

Hard Disk Drive

If the computer system you are using contains a hard disk drive, any models created using Lightyear may be stored on the hard disk. After booting up the computer and receiving the C:> prompt, make a directory (a division of the computer work space) to contain the Lightyear models by typing the DOS make directory command (md) and a directory name. For example:

```
C:>md lymodels
```

It is usually best to use a directory name that will have some significance to you so you can easily remember it. A directory name may have no more than eight characters.

After creating a directory for the Lightyear models, type the DOS change directory command (cd) and the directory name you wish to use. For example:

```
C:>cd lymodels
```

This command will place you in the "lymodels" directory.

4 STARTING THE PROGRAM AND USING THE MENUS

After turning on the computer and loading DOS into memory (either by using a start up disk or loading the operating system off of the hard disk), you will receive a prompt. If your computer system has one or two disk drives but no hard disk, you should receive an A:> prompt. If your computer has a hard disk, the prompt will be C:>.

At this point, remove any disk in drive A and insert the Lightyear program disk. If you are at an A:> prompt, simply type ly. If you have a C:> prompt type A:ly. A starting screen will appear. (Appendix A contains an example user session.)

The lower left hand corner of the starting screen displays the following message: F1=HELP F3=MAIN MENU. The Lightyear commands always appear in the lower left hand corner of the screen. The F1 key is always the Help key. At this point, you should press the F3 key to bring the Main Menu up on the screen (see Figure A1 in Appendix A).

Main Menu

The Main Menu appears with the Models submenu highlighted. There are six submenus and a Quit option available from the Main Menu. Those menus are:

- Models
- Alternatives
- Criteria
- Rules
- Evaluate
- Utilities

Use the up and down arrow keys to move the highlight box between choices on each menu. After you have moved the highlight box to a choice, press the F2 key to bring that selection to the screen. F3 will always take you back to the Main Menu. In choosing any submenu or their respective options (if any), you must always begin at the Main Menu.

This chapter will first explain how to use the utilities menu to set up the program for use on your PC. This setup should be followed by an immediate backup of your "personalized" program.

Utilities Menu

The Utilities Menu is used to set up the program for your computer. When the Main Menu is displayed, use the down arrow key to move the highlight box to Utilities and press the F2 key to bring up the Utilities Menu. The first choice in the Utilities Menu is the Storage Option (see pages 120-126 of the Lightyear manual). This option allows you to tell the program what kind of computer equipment you are using. It will set up the program for your equipment and will remember that setup for future use. You only need

to set up the program once through the Storage Option. It is recommended that you make your program backup after the first setup so that you will not have to setup again if the disk fails.

Storage Option

The Storage Option allows you to configure the software to work with a single disk drive, double disk drive, or a computer system that contains a hard disk. Storage also provides information on the amount of RAM being used and the amount of storage capacity available on the data disk.

To configure your computer system, highlight the Storage Option in the Utilities Menu and press F2 to bring up the Storage screen.

Using the up and down arrows, place the highlight box on the configuration of your computer system (whether it has one or two disk drives or a hard disk) and press F2. Lightyear will then ask you to confirm your choice and will record the option on the program disk. Once the disk configuration has been recorded, press F3 to leave Storage and return to the Main Menu.

Monitor Option

The second option on the Utilities Menu is Monitor. Move the highlight box and press the F2 function key to bring up the Monitor Option. To choose the appropriate monitor, place the highlight box on the correct choice and press F2. Lightyear will then record the option on the program disk. Press F3 to return to the Main Menu.

Print Option

The final step to configuring Lightyear for your computer involves the Print Option. Bring up the Print option by placing the highlight box on that option and pressing F2. The first step of the Print Option allows you to specify whether or not a printer is capable of Epson-compatible graphics and if a screen or report should be saved on a data disk or printed. If the printer is graphics compatible, set the Graphics choice to ON. If the printer is not graphics compatible (such as a daisy wheel printer), set the Graphics choice to OFF. Press the F2 function key to toggle between ON and OFF.

The second step of the Print Option is Print To. This step has two choices, LPT1 and PRINT.LY. Normally the Print To choice is set to LPT1 so that when a report or screen is to be printed, Lightyear sends the information to the parallel printer located on DOS printer number 1. The PRINT.LY choice can be used when you want to save a report as a file for use with a word processor. In this case, place the highlight box on Print To and press F2. Press the F3 key to return to the Main Menu.

Vocabulary Option

The final option on the Utilities Menu is Vocabulary. This option is not used in the MCA priority system. Further information about this option can be found in the Lightyear manual.

Once you have configured the Lightyear software for a particular machine, press the F3 function key to return to the Main Menu.

Backup Your Work

It is important to backup your data and information in case the original disk should become damaged or otherwise unusable. While computers are becoming more reliable, mistakes and accidents may destroy the models and data you created. Backup procedures are given below.

One or Two Floppy Disk Drive System

Use the DOS COPY command to backup data and models on floppy disks. Place the disk containing the original program models into drive A. After typing the Copy command given below, the computer will prompt you to remove the program disk and insert a blank formatted disk. If you have a two drive system, insert a previously formatted blank disk into drive B and type the following command at the A: prompt (automatic default):

COPY A:*. * B:

Then press the return key. You can use this procedure to backup both the original distribution disk and data disks. This command will copy all of the Lightyear files on the disk in drive A to the disk in drive B or from one disk to a second disk for single drive computers. The backup disk(s) may be used to reload Lightyear and the data files you have created by following the installation procedure discussed earlier. If you use the backup disk as the new "original," remember to make a new backup.

Hard Disk Drives

Two procedures are available for backing up Lightyear models and data on a hard disk. The first simply involves copying the information from the hard disk to a disk drive using the DOS copy command. The command (from the default C: prompt to disk drive A:) would be:

COPY C:*. * A:

Then press the return key. A second, more complicated method of backing up data on a hard disk uses the DOS Backup and Restore commands. Refer to the DOS manual for information and options on these commands.

The importance of frequently backing up your work on disks cannot be stressed enough. The laws of probability will eventually catch up with even the most careful computer user. If you use the backup disk as the new "original," remember to make a new backup.

Models Menu

This menu allows you to choose the program version of Lightyear. Move the highlight box down with the down arrow key until the Load option is selected. Press the F2 key and the highlight box will jump to the right box. Move the box down to the Version 2.0 line and press F2 again. This will load the priority system model into the computer's memory. After loading the model, press F3 to return to the Main Menu.

Alternatives Menu

This menu contains a blank column into which you will type the alternatives being considered for prioritization. There is a 15-character limit for alternative titles, so you may need to use abbreviations. If you want to delete an alternative after you've typed it in, press the F4 key. After typing in all the alternatives, press the F3 key to return to the Main Menu.

Criteria Menu

This menu is a list of suggested evaluative criteria. Select values for each criteria by moving the highlight box to each and then pressing F2. You can now assign a value for that criterion, within its given range. Enter values by typing in the appropriate numbers and then moving the highlight box down using the down arrow key. After you have completed the entries, press the F3 key to return to the Main Menu. After returning to the Criteria menu, you can then move the highlight box down and repeat the process for each alternative. Examples of the criteria value choices are listed in Appendix B.

Rules Menu

This menu contains rules to govern the prioritization process. The Lightyear program does not contain any rules for this application. If there are some unique requirements which will apply to all alternatives, you may type them into this menu. See the Lightyear manual for further explanation of how to input rules.

Evaluate Menu

This menu allows you to evaluate and compare the alternatives with established criteria. The menu has three options. First, you may evaluate the alternatives using All Criteria and Rules. Second, you may evaluate by Criteria Only. Third, you may evaluate by choosing Rules Only. This option is only meaningful if you have determined your own rules in the Rules Menu. If there are no rules, the first two options (All Criteria and Rules and Criteria Only) will yield the same results and the Rules Only option will give you no answer.

The final evaluation screen (which is automatically displayed) shows the various alternatives listed in order by score (sum of the added weights from criteria menu). Each bar graph represents both the total number of points possible for, and the amount actually earned, by that alternative. If you are interested in a more detailed analysis, press F2 to highlight each alternative. The screen will then show you how that alternative scored on each of the criteria. The shaded bar represents the total value associated with the particular criteria with the actual score shown on the lighter bar.

5 SUMMARY

Lightyear, as modified for this project, is a computer program that helps FORSCOM personnel prepare for the annual MCA project prioritization process. It is intended for users with little or no previous computer experience and functions as an advanced calculator and filing system that does much of the repetitive pencil work of prioritizing.

The customized program is based on the needs of DEH personnel in preparing and submitting their annual MCA project requests.

This program is an organized way of implementing a project priority system quickly and efficiently. First, the user is instructed by the program's menu choices to list all the facilities and structures (alternatives) being prioritized in the Alternatives Menu. After they have been entered, the user is asked to assign a numerical weight (from a predetermined range given in the program) for a number of the factors which must be considered for each alternative. After values have been entered for each alternative, the program will add up the total score for each alternative and show how they compare with each other.

APPENDIX A:

EXAMPLE USER SESSION

After configuring the Lightyear software for your particular computer system, place the Lightyear system disk into drive A and type A:ly after the system prompt C:> for a hard disk system or ly after the system prompt A:> for a dual floppy disk system. After the software has been loaded into memory, the initial Lightyear screen will appear. The line at the bottom refers to the function keys located on your keyboard and their particular attribute at that time. Press the F3 key and the Main Menu (Figure A1) will appear.

The Models choice should be highlighted. If not, use the up and down arrow keys to move the highlight box to the Models selection and press the F2 key to bring up the screen shown in Figure A2.

Move the highlight box down arrow until the Load option is selected. Press the F2 key and the highlight box will jump to the box on the right. Move the highlight box to Version 2.0 and press F2. This will load the priority system model into the computer's memory.

Once the model has been loaded into memory, press the F3 key to bring up the Main Menu. Move the box down to Alternatives and select it by pressing the F2 key. This will bring up a screen similar to Figure A3.

Type in the names of the various alternatives. There is a 20-character limit to alternative names. If you wish to delete an alternative, place the highlight box on the choice by using the up and down arrow keys and press the F4 key.

After typing in the names of the various alternatives, press the F3 key to return to the Main Menu. Move the box down to Criteria and press F2 to bring up the Criteria Menu (Figure A4).

Move the highlight box to the first criteria (Facility Use) and press the F2 key to enter values. This will pull up the Facility Use screen (Figure A5). Enter values by typing in the appropriate numbers and then moving the highlight box down with the down arrow key.

After you have completed the entries, press the F3 key to return to the Criteria Menu. Move the highlight box to the next criteria and press F2 to enter values for that criteria. Repeat this procedure until all of the appropriate criteria have been evaluated. Examples of these criteria choices can be found in Appendix B.

Once all of the data has been entered for the various alternatives, it is time to evaluate the results. Return to the Main Menu by pressing the F3 key. Move the highlight box down to Evaluate and press F2 to display the screen (Figure A6).

Choose either of the first two options and press the F2 key. The screen will then show you how the various alternatives scored (Figure A7). For further detail on each alternative, move the highlight box to that alternative and press F2. A screen similar to that shown in Figure A8 will then appear.

MAIN MENU	
MODELS	<p>Lightyear</p> <p>Version 1.0</p> <p>Copyright (C) 1984 Lightyear, Inc.</p>
ALTERNATIVES	
CRITERIA	
RULES	
EVALUATE	
UTILITIES	
QUIT	

F1=HELP F2=SELECT F3=NO SELECT

Figure A1. Main menu.

Lightyear

SUBJECT: priority sys
VERSION: 2.0

MODELS
NEW
PASTE
SAVE
LOAD
ERASE
RENAME
VIEW
DUPLICATE
COMPARE

SUBJECT	VERSION
priority sys	2.0

F1=HELP F2=SELECT F3=MAIN MENU

Figure A2. Models menu.

Lightyear

SUBJECT: priority sys
VERSION: 2.0

ALTERNATIVES
HOSPITAL CLINIC
FIRESTATION
FITNESS CENTER
ADMIN. BUILDING

F1=HELP F3=MAIN MENU F4=DELETE ALTERNATIVE

Figure A3. Alternatives menu.

Lightyear

SUBJECT: priority sys
VERSION: 2.0

CRITERIA	MODE	WEIGHT
FACILITY USE	N	10
PROJECT PURPOSE	N	5
READINESS	N	5
HEALTH	N	4
SECURITY	N	5
SAFETY	N	4
ENERGY CONSERV.	N	5
ENVIRONMENTAL	N	4
QUALITY OF LIFE	N	4
▽ CMD. INTEREST	N	3

F1=HELP F2=ENTER VALUES F3=MAIN MENU F4=DELETE CRITERION

Figure A4. Criteria menu.

Lightyear

SUBJECT: priority sys
VERSION: 2.0

CRITERION: FACILITY USE

ALTERNATIVES	VALUE
HOSPITAL CLINIC	10
FIRESTATION	10
FITNESS CENTER	5
ADMIN. BUILDING	1

VALUE RANGE
MOST DESIRABLE:10
LEAST DESIRABLE:0

F1=HELP F3=FINISHED ENTERING VALUES

Figure A5. Facility use screen.

Lightyear

SUBJECT: priority sys
VERSION: 2.0





EVALUATE USING
ALL CRITERIA & RULES
CRITERIA ONLY
RULES ONLY

F1=HELP F2=SELECT F3=MAIN MENU

Figure A6. Evaluation choices.

LIGHTYEAR

SUBJECT:priority sys
VERSION:2.0

RANK	SUMMARY EVALUATION: CRITERIA ONLY	SCORE
1 HOSPITAL CLINIC		62
2 FIRESTATION		49
3 ADMIN. BUILDING		27
4 FITNESS CENTER		26

F1=HELP F2=DETAIL EVALUATION F3=MAIN MENU F4=LOCK

POSSIBLE= 92

Figure A7. Alternatives total scores.





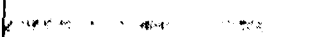


SUBJECT:priority sys
VERSION:2.0

Lightyear

DETAIL EVALUATION: CRITERIA ONLY

SCORE WEIGHT

HOSPITAL CLINIC	62	92
-----------------	----	----

FACILITY USE		10	10
PROJECT TYPE		10	10
BLG. CONDITION		0	10
INST. PRIORITY		10	10
PROJECT PURPOSE		5	5
READINESS		5	5
SECURITY		3	5

F1=HELP F2=ENTER VALUES F3=MAIN MENU F4=SUMMARY EVALUATION

Figure A8. Detailed evaluation of one alternative.

APPENDIX B:

FORSCOM CRITERIA VALUE RANGES

<i>Type of Use</i>	<i>Rating Range</i>
Operational Facility	8-10
Personnel Living Space	8-10
Training Facilities	7-9
Hospital & Related Facilities	7-9
Morale & Recreational Facilities	7-9
Utilities Plants & Systems	6-9
Technical & Industrial Facility	5-8
Transportation & Drainage Facilities	4-6
Administrative Facilities	3-5
Others	0-2

Figure B1. Facility use values.

Mission	Rating
Readiness	5
Training	4

Figure B2. Readiness values.

Environment	Range
Eliminate discharge of harmful pollutants	4
Execute program that contributes to National goal of preserving and enhancing environment	3
Maintain, restore and enhance natural man-made environment	1 - 2

Figure B3. Environment values.

Quality of Life	Rating
Adequate Housing	4
Food and Clothing	3
Recreation	2
Education	1

Figure B4. Quality of life values.

Health	Rating
Emergency Medical Care	4
Surgical/Post Operation	4
Laboratory/X-ray	4
Pharmacy	4
Areas for Outpatient/Inpatient	4
Maternity	3
Preventative Medicine	3
Treatment Program	3
Contagious Disease	3
Pediatric	2
Diagnostic Testing	2

Figure B5. Health values.

Security Items	Rating
Ammunition	4
Firearms and Weapons	4
Missiles and Rockets	4
Aircraft	4
Communication/Electronics	4
Tac Vehicle	4
Fuel Vehicle	4
Prestock Points	4
Pharmacy/Medical/Drug	3
RDT & E Lab	3
Audio Visual Equipment	2
Other (Vandalism, Theft)	1

Figure B6. Security values.

Accident Probability

	Likely to occur immediately or within a short period of time	Probably will occur in time	May occur in time	Unlikely to occur
Catastrophic May cause death or loss of system	4	4	3	2
Critical May cause severe injury, severe occupational illness, or major system damage	4	3	2	1
Marginal May cause minor injury, minor occupational illness or minor system damage	3	2	1	1
Negligible Probably would not affect personnel safety or health but is, nevertheless, in violation of specific standards	0	0	0	0

Figure B7. Risk assessment values.

Mission Function	Rating
Most Critical	4
More Critical	3
Critical	2
Less Critical	0-1

Figure B8. Mission factor values.

<i>Types of Failure</i>	<i>Rating</i>
Failure — Equipment or facility cannot be used for its intended purpose (Immediate)	10
Failure imminent, advanced stage of deterioration, requires frequent repairs (1 - 3 yrs)	8
System functional, but deterioration is evident and will progress further if project is not accomplished (4-6 years)	4
Little deterioration at present time, but project work still considered essential (otherwise project not validated). (Beyond 6 years)	2

Figure B9. Condition values.

DISTRIBUTION

FORSCOM

**FORSCOM Engr., ATTN: AFEN-DEH
ATTN: DEH (23)**

TRADOC

**HQ, TRADOC, ATTN: ATEN-DEH
ATTN: DEH (19)**

Defense Technical Info. Center 22314

ATTN: DDA (2)

46

1/88